
I. *Inventio Curvæ quam Corpus deſcendens breviſſimo tempore deſcriberet; urgente Vi Centripetâ ad datum punctum tendente, quæ creſcat vel decreſcat juxta quamvis Potentiam diſtantiæ à Centro; dato nempe imo Curvæ puncto & altitudine in principio Caſus. Per* Joh. Machin, Aſtron. Profeſs. Greſh. & Reg. Soc. Secret.

SIt centrum Virium C, (*Fig.* 1. 2), quo centro ad diſtantiam CB æqualem altitudini unde Corpus caſurum eſt, deſcribatur Circulus B E G, & fiat angulus B C G rectus. Ponatur A punctum Curvæ infimum, ubi axi C B occurrit ad datam diſtantiam C A. Oportet invenire punctum Q, ubi Curva celerrimi deſcenſûs E Q A occurrit circulo Q F, ad datam aliam diſtantiam C F. Problema hoc duos habet Caſus, quorum alter pendet ab Hyperbola & Circulo, alter ab Ellipſi & Circulo.

Caſ. 1. Si fuerit Vis centripeta reciproce ut diſtantia à Centro. Sit K L M (*Fig.* 1.) Hyperbola quævis rectangula centro C & Aſymptoto C B deſcripta, quæ occurrat normalibus B K, A M ſuper ipſam B C ad puncta B, A erectis, in K & M; ordinatæ vero cuilibet intermediæ F L ad punctum F erectæ, in L. Fiat C D ad C G ut $\surd AFLM$ ad $\surd ABKM$, & ſit D H normalis ſuper CG: dein capiatur Sector RCB ad Aream HDCB ut data Area Hyperbolica A B K M ad datum Rectangulum $CA \times AM$. Tum recta R C occurret circulo F Q in puncto Q, quod quidem eſt ad Curvam celerrimi deſcenſus E Q A.

Hab-

Habebitur autem punctum E, à quo inciperet Corporis caſus, capiendo Sectorem B G E ad Aream Quadrantis B C G, in eadem ratione Areæ Hyperbolicæ A B K M ad rectangulum ſub C A & A M contentum.

Coroll. Hinc ſi recta R C, circa centrum C revoluta, faciat Sectores R C B proportionales Areis H D C B, in quibus quadrata Baſium C D ſumuntur in progreſſione Arithmeticâ: tum rectæ C R interſecabunt Curvam E Q A ad diſtantias à centro C Q, quæ decreſcant in progreſſione Geometricâ

Caſ. 2. Si vero Vis centripeta fuerit reciproce ut alia quævis Poteſtas diſtantiæ à centro; ſit $n + 1$ Index iſtius Poteſtatis (ubi n poteſt eſſe Numerus quilibet integer vel fractus, affirmativus vel negativus) ſitque $H = CB$ altitudo maxima Curvæ quæſitæ E Q A, $h = CA$ altitudo minima ejuſdem, & $A = CF$ altitudo alia quævis intermedia. *Fig.* 2.

In recta C G capiatur C D ad C B ut $\sqrt{h^n}$ ad $\sqrt{H^n}$, atque etiam C H ad C D ut $\sqrt{A^n - h^n}$ ad $\sqrt{H^n - h^n}$. Centro C, ſemiaxibus C D, C B, deſcribatur Ellipſis B L D, cui occurrat ordinatim applicata H L in puncto L; & ducatur recta L K, quæ Ellipſin tangat in L, & Axi minori C D producto conveniat in K: dein Tangenti K L parallela ducatur N M, circulum B E M G tangens in M & ipſi C D occurrens in N. Denique capiatur Sector R C B, qui ſit ad Aream N M B L K N, inter Circulum & Ellipſin & utriuſque Tangentes rectamque N K comprehenſam, in ratione Numeri binarii ad Numerum n. Tum recta R C interſecabit Circulum F Q in puncto Q, quod erit ad Curvam celerrimi Deſcenſus E Q A.

Quod ſi fiat Sector B C E ad aream B D G, inter Ellipſeos & Circuli Quadrantes interceptam, in ratione dictâ Binarii ad Numerum n, coeuntibus ſcilicet punctis L, D & M, G; (ob $A^n = H^n$) erit punctum E unde in-

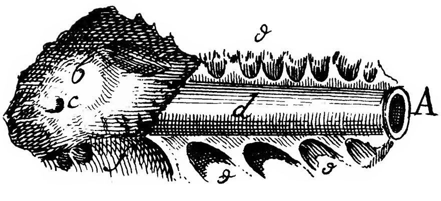
choa-

choaretur Caſus Corporis breviſſimo tempore deſcendentis ad A, deſcenſuque ſuo Curvam E Q A deſcribentis, quam tangit recta C E in E, quamque ad angulos rectos ſecat C B in A.

Harum Conſtructionum Demonſtrationes è Celeberrimi D. *Newtoni Quadraturis*, ejuſdemque *Philoſ. Nat. Principiis* (Prop. XXXIX. & ſequentibus aliquibus) petitæ, aliâ datâ occaſione oſtendentur. Problema autem eſt alterius generis, Deſcribere Curvas per quas Corpora, de puncto ſummo E, ſeu principio caſus, demiſſa, celerrimo deſcenſu ad inferiora data puncta Q, urgente qualibet Vi centripeta, ferrentur; cujus quidem ſolutio in poteſtate eſt. In præſentia ſufficiat generalem hujuſmodi Curvarum tradidiſſe Ideam, earumque ad Circuli & Hyperbolæ Quadraturas relationes indicaſſe, abſque quibus eaſdem Geometrice conſtruere haud adeo proclive eſt.

Philosoph: Transact. No. 358.

Fig, 1,



Fig, II.

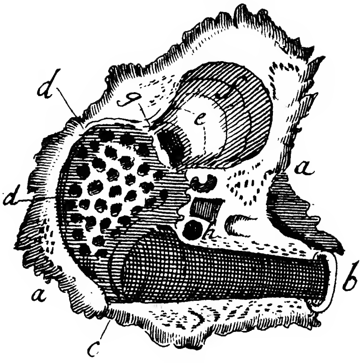


Fig. III

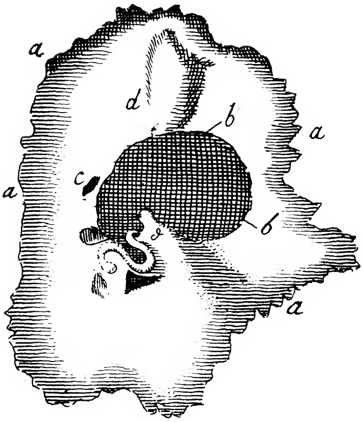
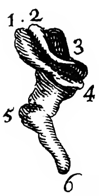


Fig. IIII



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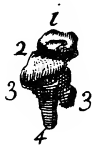

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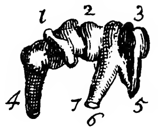
VII.



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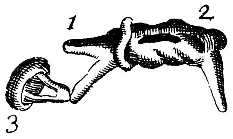

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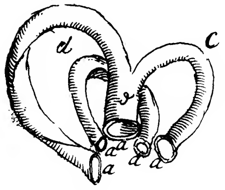

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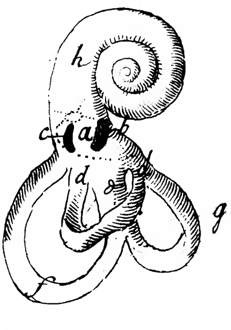
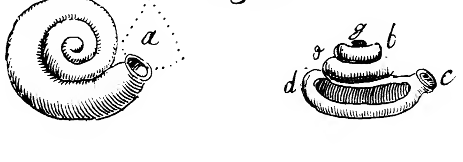


Fig XI



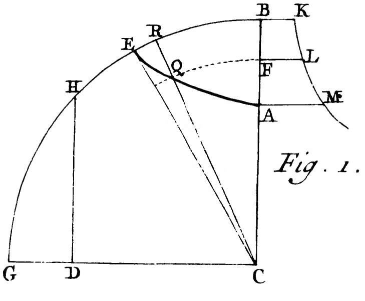


Fig. 1.

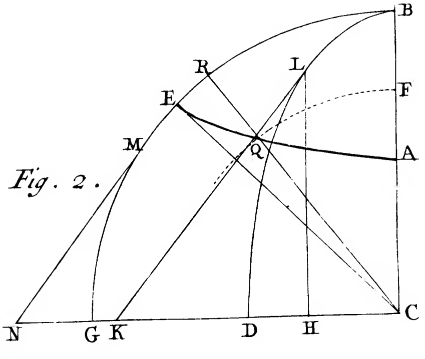


Fig. 2.